**June 2023**

**Talkin' Crap Podcast Launched**

Check out our new podcast, Talkin' Crap. Join Dan Andersen each month to discuss the science, technology, and best management practices surrounding manure management. In the first episode, Dan Andersen, Rachel Kennedy, and Melissa McEnany discuss circularity and systems thinking in livestock manure management in our first podcast. Take a listen [here](#).

**The Phosphorus Index says no more manure; how long before I can apply again?**

The Iowa Phosphorus Index (P-Index) is a tool developed by the Iowa NRCS and Iowa State University to assess the risk of phosphorus loss from agricultural fields and protect water quality. While typically used with nutrient management planning, the phosphorus index isn’t a nutrient need or agronomic assessment tool but a water protection tool. The Iowa P-Index provides a framework for farmers and land managers to evaluate the potential for phosphorus runoff and make informed decisions regarding phosphorus fertilizer applications for water quality.

The P Index considers various factors influencing phosphorus transport, including soil characteristics, landscape features, and management practices. These factors are assigned numeric values, and their cumulative score determines the risk level associated with phosphorus loss. The higher the index score, the greater the risk of phosphorus runoff.

Key components considered in the Iowa P Index include:

- **Soil Test Phosphorus**: Fields with higher soil phosphorus concentrations are assigned higher index values, indicating a greater risk of phosphorus loss.

- **Landscape Characteristics**: The P Index accounts for the field’s slope, proximity to water bodies, and buffer strips or conservation practices. Steeper slopes and fields near water bodies increase the risk of phosphorus runoff, while conservation practices mitigate this risk.

- **Management Practices**: The index considers the timing and method of phosphorus application and erosion control practices. It evaluates factors such as fertilizer placement, incorporation, and erosion control measures, assigning different scores based on their potential impact on phosphorus loss.

Based on the cumulative index score, the P Index categorizes fields into risk categories, ranging from low to high. This information helps farmers and land managers identify fields that require additional management practices to minimize phosphorus runoff.

When used in manure planning, the P Index specifies when phosphorus application limits manure application rates. As a result, manure can no longer be applied without management changes that reduce the risk of continued application negatively affecting nearby...
waters. Several options exist, such as reducing soil loss by increasing erosion control practices such as reduced tillage, no-till, and cover crops. Alternatives include adding terraces, buffers, or adding perennials to the crop rotation. The most straightforward change is to stop applying phosphorus fertilizers, like manure, to fields. While this change may appear clear, it is also essential to know that while the buildup of soil phosphorus can occur relatively rapidly, the drawdown of phosphorus from the soil is relatively slow.

**Soil Phosphorus Buildup:** Soil phosphorus buildup occurs when there is an excessive accumulation of phosphorus in the soil, typically resulting from long-term phosphorus inputs that exceed plant nutrient demands. When these inputs consistently exceed crop uptake, phosphorus will accumulate in the soil. Phosphorus accumulation often occurs with livestock manures as it often isn't balanced for crop demands.

**Soil Phosphorus Drawdown:** Soil phosphorus drawdown refers to reducing phosphorus levels in the soil. Natural phosphorus drawdown happens through several mechanisms, including plant uptake, leaching, and soil erosion.

If my field reaches a high soil phosphorus level and triggers a phosphorus index, how long will it take to draw it down?

To help answer this question, we have to make a few assumptions. Let's assume our phosphorus index was triggered when the soil test phosphorus reached 100 ppm. We aim to get it down to 34 ppm before we apply manure again (34 represents the top of the high range for Mehlich-3 P recommendations in A Generate Guide for Crop Nutrient and Limestone Recommendations in Iowa).

Dr. Mallarino reported it took about 47 lb P\textsubscript{2}O\textsubscript{5}/acre to decrease the soil test P by one ppm.

We want a 66 ppm change, so we need to remove around 3,100 lb P\textsubscript{2}O\textsubscript{5}.

Corn grain averages around 0.32 lb P\textsubscript{2}O\textsubscript{5}/bu, so we must harvest 9700 bushels to reach our target soil P. At 200 bu/yr, that works out to almost 50 years!

In a corn-soybean rotation, it would take almost 60 years to remove this amount of P\textsubscript{2}O\textsubscript{5} with the harvest grain (at 200 bu corn and 60 bu soybean).

As a general rule of thumb, a corn-soybean rotation that doesn't get any phosphorus fertilizer will change soil P content by 1-2 ppm per year, so this drawdown would take about 33-66 years, right in the ranges we are calculating. These are best estimates based on existing data; initial phosphorus drawdown rates may be slightly faster in fields with high or very high phosphorus levels.

What does this mean for you? While you may not be hitting the phosphorus index thresholds that would limit manure application, planning and approximately balancing phosphorus application with removal help ensure not only that you are maximizing fertilizer value from manure and can continue to use those fields for manure application for years to come.

**Manure Scoop**

Carbon footprints have become an essential part of discussing sustainability. Please look at this month's manure scoop to get an idea of how farms have been working on improving their carbon footprints for years and to get an idea about what the carbon footprint for a swine-finishing farm might be. You can find the Manure Scoop here.
Events

**Vector Control on Livestock Operations webinar**
June 16, 2023, 1:30 pm

**Midwest Compost School 2023**
June 20-22, 2023
Ames, Iowa

**North American Manure Expo**
August 9-10, 2023
Arlington, Wisconsin